

REMARKS

The application has been amended as needed so as to place it in condition for disposal at the time of the next Official Action.

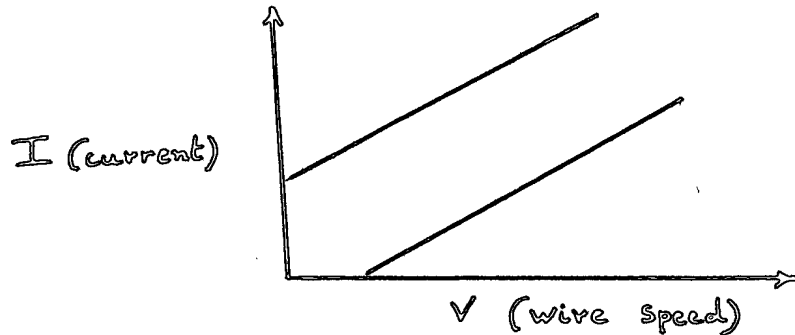
The Official Action had rejected claims 1-14 under 35 USC §112, first paragraph, as containing subject matter which is allegedly not described in the specification in such a way as to enable one skilled in the art to which it pertains, or which it is most nearly connected, to make and/or use the invention. It is advanced that the equations presented by applicants in the written specification and in the claims do not make any sense because the dimensions on either side of the equal sign do not match.

Reconsideration of the above rejection is respectfully requested for the following reasons.

There is really no problem of dimensions in the claims, nor in the specification, as the equations presented therein are only the mathematical representations of straight lines. Indeed, it is elementary that a linear function is generally represented as $f(x) = y = mx + b$, where m and b are real-number constants. The value m is called the slope of the function, and b is the point at which the graph of the function crosses the ordinate axis. For the Examiner's convenience, there is submitted herewith page 511 of the Encyclopedia of Electronics, 2nd Edition, which clearly explains the concept of linear function.

In the present invention, and working with the mathematical representation of a straight line $y = mx + b$, the y is I_{mean} or I_{rms} , the x is V_{wire} , the a is A_1 or A_2 , and the b is B_1 or B_2 .

Hence, in order to reproduce the invention, a skilled artisan has only to draw the corresponding lines on a graph, where the ordinate or y -axis represents the I values (in amps), and the abscissa or x -axis represents the wire speed V_{wire} values (in m/min) as follows:



Claims 1-14 were rejected under 35 USC §103(a) as being unpatentable over MATSUI et al. 5,525,778. The Official Action states that the claims differ from MATSUI et al. in setting forth an equation relating wire feed speed to current values, and in calling for welding particular metals in the dependent claims. It is concluded that it would have been obvious that the system of MATSUI et al. would be operated in a steady state, since this is the most efficient way to weld. If it is operated in a steady state, then the wire melting rate will be in balance with the

wire feed rate, and obviously the equations that applicants recite in their claims would be satisfied.

Reconsideration of the above rejection is respectfully requested for the following reasons.

As is recognized by the Official Action, the MATSUI et al. reference is silent about any existing relation or link between the I values and the wire speed values during an arc welding process.

However, as is clearly explained on page 4 of the original specification, it is generally not easy to determine the synergic curves of a pulsed MIG/MAG welding system or process (see page 2, lines 35-38 and page 3, lines 1-6 of the specification) as this determination is quite difficult to carry out. It is empirical and can only be accomplished by carrying out numerous trials, the number of which is proportional to the number of parameters to be taken into account (see page 4, lines 16-24).

The problem solved by the present invention was to propose a welding process that avoids making numerous trials, but leads to an efficient synergic control of the welding parameters including the current, and the wire speed, while keeping in mind that a good pulsed-current synergic control should lead to a single detachment per pulse, to a spatter free welding, and to a small arc height, as set forth on page 3, lines 22-25 of the specification.

A careful review of the MATSUI et al. reference will reveal that the goal of this document was to propose a welding process leading mainly to an adequate weld thickness and a good mechanical strength (see column 1, lines 60-63), to an optimum pulse form (column 2, line 4), and to a low inclusion of blowholes in the weld (column 2, lines 25-26).

The solution provided by MATSUI et al. is based on a control of the pulse periods and duration, of the arc length and of the peak current value.

However, as is recognized in the Official Action, the stubborn fact remains that MATSUI et al. are silent about any existing relationship between I values and wire speed (V_{wire}).

In summary, it is respectfully submitted that the MATSUI et al. reference simply fails to disclose or suggest the characteristic features recited in independent claim 1. Consequently, it cannot be stated that it would have been obvious to a person having ordinary skill in the art to arrive at the solution provided by the herein claimed invention.

In view of the present amendment and the foregoing remarks, therefore, it is believed that this application has been placed in condition for allowance. Reconsideration and allowance are accordingly earnestly solicited.

In the event that there are any questions relating to this amendment or to the application in general, it would be appreciated if the Examiner would telephone the undersigned

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attorney concerning such questions so that the prosecution of this application may be expedited.

Attached hereto is a marked-up version showing the changes made to the specification. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

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"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

IN THE SPECIFICATION:

Page 11, the paragraph, beginning on line 32, has been amended as follows:

--[Thus, Figure 3 shows the] The variation in the I_{mean} and I_{rms} values as a function of the wire speed (V_{wire}) were obtained with a consumable wire sold by La Soudure Autogène Française under the name NERTALICTM 70S having a diameter of 1.2 mm and with the use of a shielding gas sold by L'Air Liquide under the name ARCALTM 21 (an Ar/CO₂ mixture).--.

Page 12, the paragraph, beginning on line 1, has been amended as follows:

--[As may be seen,] It has been demonstrated that the variation is virtually linear over the entire wire speed range in question.--.